LASER WAVELENGTH METER

ABSTRACT

A long life laser wavelength meter is based on a Michelson interferometer with a flexure scanner. The scanner has a bar, preferably balanced about a pivot axis defined by a flexural pivot which supports the bar. Retroreflectors are mounted on the bar, equally spaced from the pivot axis. Long life is obtained by cycling or oscillating the bar over a limited range of angular movement within the bending limits of the flexure, which obtains a predicted, essentially infinite cycle life of the flexure. A large optical path length change for each scan of the oscillating bar is obtained through the use of the retroreflectors which fold the optical paths of each arm of the interferometer before reaching a fixed end mirror. The end mirror directs each optical path back through the same set of optical components, including the retroreflectors, to a beamsplitter which combines the light beams from both paths creating an optical interference beam output to a detector. Wavelength measurements are based upon the use of a reference light beam of accurately known wavelength and an input light beam of unknown wavelength that is to be measured. The reference beam and input beam transverse identical optical paths in the interferometer, to a measurement system which separately detects intensity fringes created by interference of the reference and input beams. By providing input and reference beams which are coincident and which traverse identical paths systemic errors during scanning are substantially eliminated. Changes in optical path length greater than 100mm are obtainable in a compact interferometer.